



REMARKS

The detailed non-final Office Communication prepared by the Examiner and mailed March 8, 2004 is noted with appreciation. The Examiner's effort in responding to the Applicants response and effort to assist the Applicant and to bring the application into condition for allowance is greatly appreciated.

In response to the outstanding Office Action, claims 92, 103, 107, 110-112, 115, 121-122 and 124 have been amended; claims 99 and 100 have been cancelled and new claims 125-135 have been added. Claims 92, 103, 107, 110-112, 115, 121-122 and 124 having been amended; claims 99 and 100 having been cancelled; and new claims 125-135 having been added, the claims now pending in the present application are claims 92-98, 101-115 and 119-135. Support for the amendments to the claims is found in numbered paragraphs 24, 26, 62, 63 and 64 of the published specification. Favorable consideration of the claims now pending in the present application is respectfully requested.

The Examiner's response to arguments noted on page 2 of the outstanding Office Action, noting the withdrawal of the objections to the disclosure and to claims 99 and 100 and also noting the withdrawal of the rejection of claims 98, 116 and 117, is noted with appreciation.

On page 3 of the outstanding Office Action, claims 92-114 have been rejected under section 103(a) as being unpatentable over Elliott et al. (U.S. Patent No. 5,669,979). The Examiner's detailed response to the arguments made by the Applicant is noted with appreciation. In response, underlying independent claim 92 has been

amended to further clarify that the substrate is “chemically” modified when exposed to the active zone. It will be appreciated that the chemical modification of the surface of the substrate will enhance the degree to which the adherence of the material for which the surface of the substrate is prepared.

In this regard, it is respectfully submitted that Elliott et al. only teach cleaning of a surface and take pains to emphasize that in cleaning the surface they use only enough energy projected to clean the surface and specifically indicate that the energy level delivered to the surface of the substrate is projected to be “insufficient to damage the surface” (see column 2, lines 46-48; column 2, lines 52-55; column 4, lines 16-23; column 4, lines 41-44; column 6, lines 6-8; column 6, lines 27-29; etc.). It will be appreciated that the concern expressed by Elliott et al. regarding damage to the surface, teaches against chemically modifying the surface to improve adherence of materials and, therefore, distinguishes Elliott et al. from the present invention. In the present invention, specific efforts are made to change the surface and chemically modify it. In “chemically” modifying the substrate surface, the present process directly alters the chemistry of the surface. The resultant goal of altering the surface chemistry is purposely damaging the original surface and creating a new and different surface that has significantly enhanced adherence properties.

It will be appreciated from a close review of Elliott et al. that the present invention is distinguished from the disclosure of Elliott et al. in that the present invention includes exposing a substrate surface to electromagnetic radiation that is sufficient to chemically modify the surface to prepare the surface for adherence of a material of the kind specified in the application. This chemical modification damages the surface. As

noted above, Elliott et al. teach the use of insufficient energy to damage the surface and, therefore, teach away from the present invention. The goal of Elliott et al. is simply to clean the surface in the manner described and to avoid doing anything to the surface that will damage it. In view of the foregoing and in view of the amendments to the aforementioned claims, it is respectfully submitted that the present claims are now in condition for allowance. Insofar as the present rejection may be maintained with respect to present claims 92-114, reconsideration and withdrawal is respectfully requested.

On page 7 of the outstanding Office Action, the Examiner notes that the rejection of claims 115 and its dependent claims, 119-120 has been withdrawn in view of the prior amendment. The Examiner's comments in this regard are noted with appreciation.

On page 8 of the Office Action the Examiner has objected to informalities in claims 103, 119, 120 and 124. It is respectfully submitted that amendments to each of the aforementioned claims have been made to address each of the informalities noted in the outstanding Office Action. In view of these amendments, it is respectfully submitted that the aforementioned objections are now moot. Insofar as these objections may be maintained with respect to the present claims, reconsideration of the withdrawal is respectfully requested.

On pages 9 and 10 of the outstanding Office Action, separate rejections of claims 124 and claims 11 and 12 are made under section 112, first paragraph. In each case, amendments have been made to the claims to address the concerns raised by the Examiner. For that reason, it is respectfully submitted that the aforementioned rejections are now moot. Insofar as these objections may be maintained with respect to

claims are made under section 112, second paragraph. In each of these cases, amendments have been made to address the concerns raised by the Examiner. In view of the amendments, it is respectfully submitted that these rejections are not moot. In so far as any of these rejections may be maintained with respect to the present claims, reconsideration and withdrawal is respectfully requested.

At the bottom of page 12 of the outstanding Office Action and continuing over to pages 13, 14, 15 and 16, the Examiner has rejected claims 121-124 under section 103(a) as being unpatentable over Elliott et al. In this regard, the Applicant reiterates respectfully his belief that the intensity of the energy delivered at the surface of the substrate as disclosed by Elliott et al. is reduced over the density of the energy in the actual beam itself, because of the angle of incidence. As noted by the Examiner, the energy density described in Elliott et al. is specified in mJ/cm^2 for a beam of radiation. As noted by Elliott et al., "the energy density of a laser beam pulse is defined herein as the beam intensity, measured normal to the direction of the beam propagation integrated over the duration of the pulse." (see column 8, lines 3-6) By delivering the beam of energy at an angle of 80 degrees to the normal angle of incidence, the resultant energy density of the beam on the surface would only be about 17% of the incoming energy density or about $340 \text{ mJ}/\text{cm}^2$ if the energy density of the incoming beam is $2,000 \text{ mJ}/\text{cm}^2$. This is the reason Elliott et al. teach delivering the energy at an oblique angle to the surface and it is supported by the information illustrated in Figure 8 of Elliott et al., which indicates that a much higher beam energy density can be used without damaging an ion-implanted silicon wafer if the degrees from normal incidence is increased to 80° as disclosed by Elliott et al. It is respectfully submitted that this is

because only 17% of the energy density in the beam is actually delivered to the surface of the substrate as previously noted, while particles near the surface may take the brunt of the energy density the beam strikes the particle at a more normal incidence.

Furthermore, it is noted that the underlying independent claim, claim 121 has been amended to recite that the substrate is “chemically modified” to improve adherence of the material onto the surface of the substrate as a result of the step of exposing the surface of the substrate to the electromagnetic radiation. As asserted above, with respect to the Applicant's remarks regarding independent claim 92, it is respectfully submitted that this recitation distinguishes the present claim from the disclosure of Elliott et al. in which careful use of the electromagnetic radiation is made in the manner calculated to avoid any damage to the substrate surface. In view of the foregoing, it is respectfully submitted that the present claims are distinguished from the disclosure of Elliott et al. and, to the degree that the present rejection may be maintained with respect to the aforementioned claims, reconsideration and withdrawal are respectfully requested.

The Examiner's comments regarding allowable subject matter on page 16 of the outstanding Office Action are noted with appreciation.

The Examiner's note regarding any inquiry to the Examiner, indicating that the Examiner would be open to a telephone conference regarding this matter is also noted with appreciation. In this regard, the Applicant respectfully requests Examiner to reserve for the Applicant the right to interview the present application either in a telephone conference or in person, if additional informalities or rejections over the cited prior art references remain following the Examiner's review of the present amendments.

It is the Applicant's desire to be as helpful as possible in finding suitable claim language to bring the present application into condition for allowance. The Examiner's indulgence in this regard will be appreciated.

As noted above, the Applicant has amended the claims to add new claims 125-135. New claims 125-127 depend from independent claim 121, through dependant claim 124, and new claims 129-135 depend from new independent claim 128. The Examiner's consideration of these new claims will be most appreciated and an indication of allowability will be kindly welcomed.

Enclosed herewith is a Petition for a three-month extension of time in which to respond to the outstanding Office Action, along with a check for the required fee, thereby extending the period for responding to the outstanding Office Action from June 8, 2004 to September 8, 2004. The Examiner's indication that the present response is timely filed will be appreciated. If any additional fees are needed to insure that the present response is timely filed, please charge any such fees to deposit account number 13-4300, the deposit account of the law firm of the undersigned attorney. Thank you.

If Examiner wishes to speak directly to the undersigned attorney in regard to any informalities or other matters that may be discussed and resolved over the telephone, the Examiner is urged to contact the undersigned attorney at the telephone number provided below. The Examiner's indulgence in this regard will be appreciated.

In view of the foregoing, it is respectfully submitted that the claims now pending in the present application are in condition for allowance and notification to that effect is earnestly solicited.

Respectfully submitted,

For the Applicant,

By his Attorneys

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September 8, 2004

By 
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